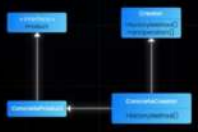
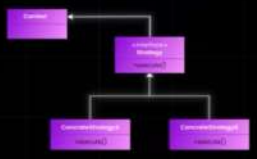
Factory Method



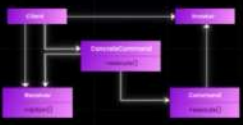
Observer

Strategy



Decorator

Command



Adapter

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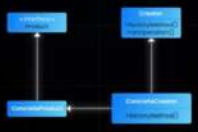
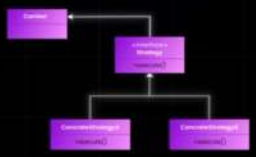
Factory Method



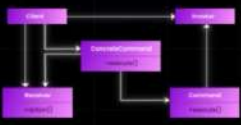
Observer

Strategy



Decorator

Command



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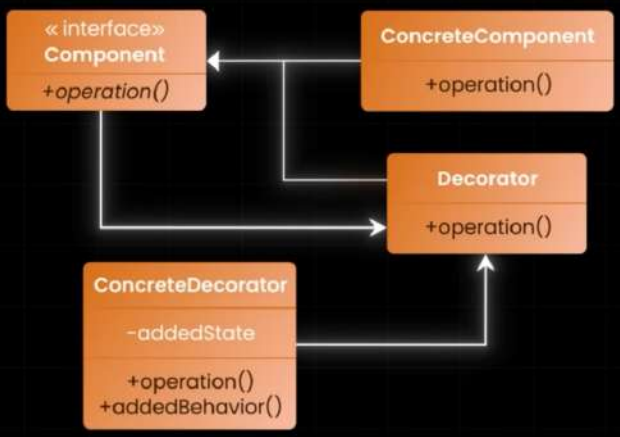
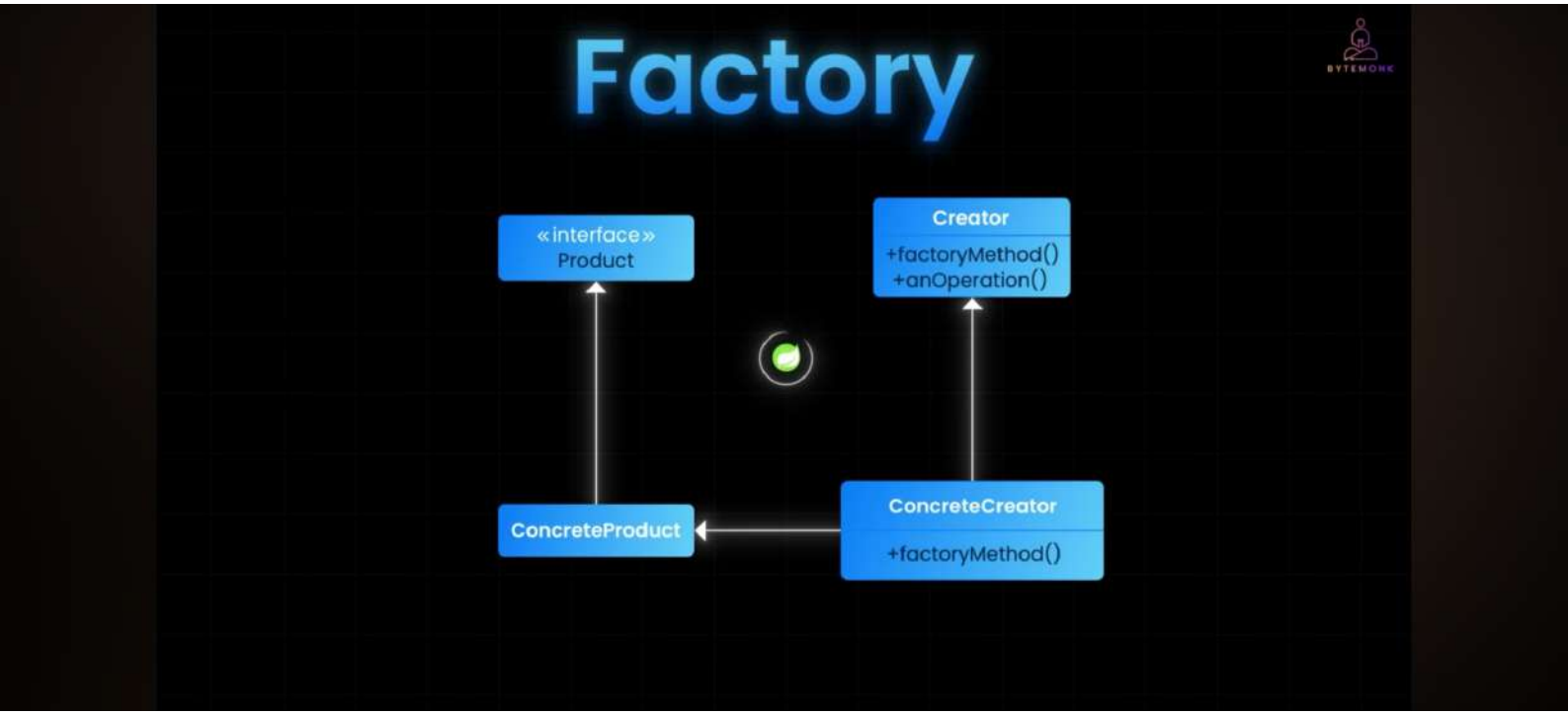
Decorator


« interface»
Component
+operation()
ConcreteComponent
+operation()
Decorator
+operation()
ConcreteDecorator
-addedState
+operation()
+addedBehavior()


Factory
BYTEMONK
«interface»
Product
Creator
+factoryMethod()
+anOperation()
ConcreteProduct
ConcreteCreator
+factoryMethod()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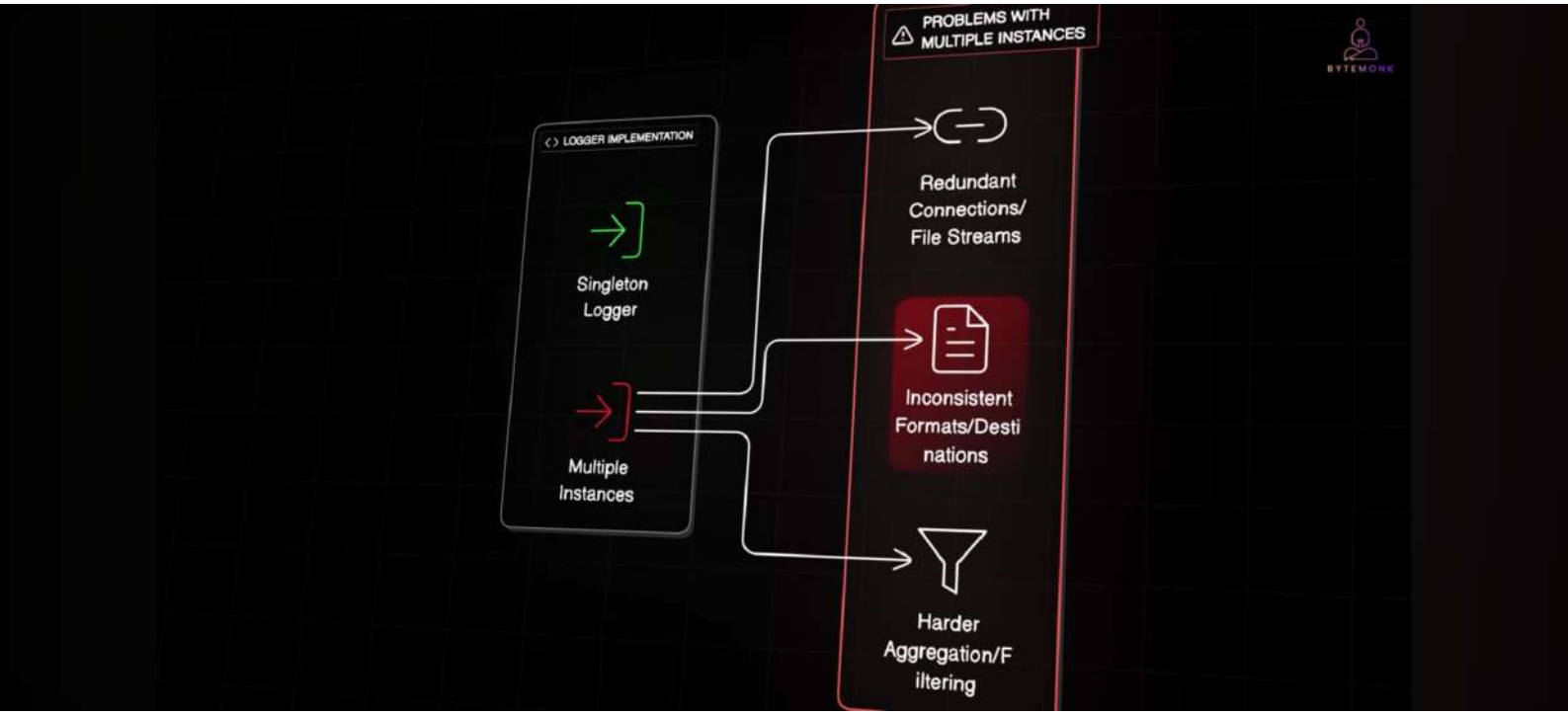
Shared Vocabulary
C Abstract Factory
S Adapter
S Bridge
C Builder
B Chain of Responsibility
B Command
S Composite
S Decorator
S Facade
C Factory Method
S Flyweight
B Interpreter
B Iterator
B Mediator
B Memento
C Prototype
S Proxy
B Observer
C Singleton
B State
B Strategy
B Template Method
B Visitor


PROBLEMS WITH MULTIPLE INSTANCES
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LOGGER IMPLEMENTATION
Singleton Logger
Multiple Instances
Redundant Connections/ File Streams
Inconsistent Formats/Desti nations
Harder Aggregation/F iltering

Singleton

Logging - Configuration - Environment setup

- It hides dependencies—makes unit testing harder
- It introduces a global state, which can lead to unexpected side effects
- And overusing it can violate the Single Responsibility Principle

Singleton

- It hides dependencies—makes unit testing harder
- It introduces a global state, which can lead to unexpected side effects
- And overusing it can violate the Single Responsibility Principle

Singleton

- It hides dependencies—makes unit testing harder
- It introduces a global state, which can lead to unexpected side effects

Singleton

- It hides dependencies—makes unit testing harder


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Singleton
Anti Pattern


BYTEMONK
Singleton

Lazy Initialization

BYTEMONK

java

```java
public class Singleton {

    // Step 1: Volatile instance to prevent instruction reordering
    private static volatile Singleton instance = null;

    // Step 2: Private constructor to prevent external instantiation
    private Singleton() {
        // Initialization logic (optional)
    }

    // Step 3: Public method to provide global access point
    public static Singleton getInstance() {
        if (instance == null) { // First check (no locking)
            synchronized (Singleton.class) {
                if (instance == null) { // Second check (with locking)
                    instance = new Singleton();
                }
            }
        }
        return instance;
    }
}
```

Double Check Locking

BYTEMONK

java

```java
public class Singleton {

    // Step 1: Volatile instance to prevent instruction reordering
    private static volatile Singleton instance = null;

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            }
        }
        return instance;
    }
}
```

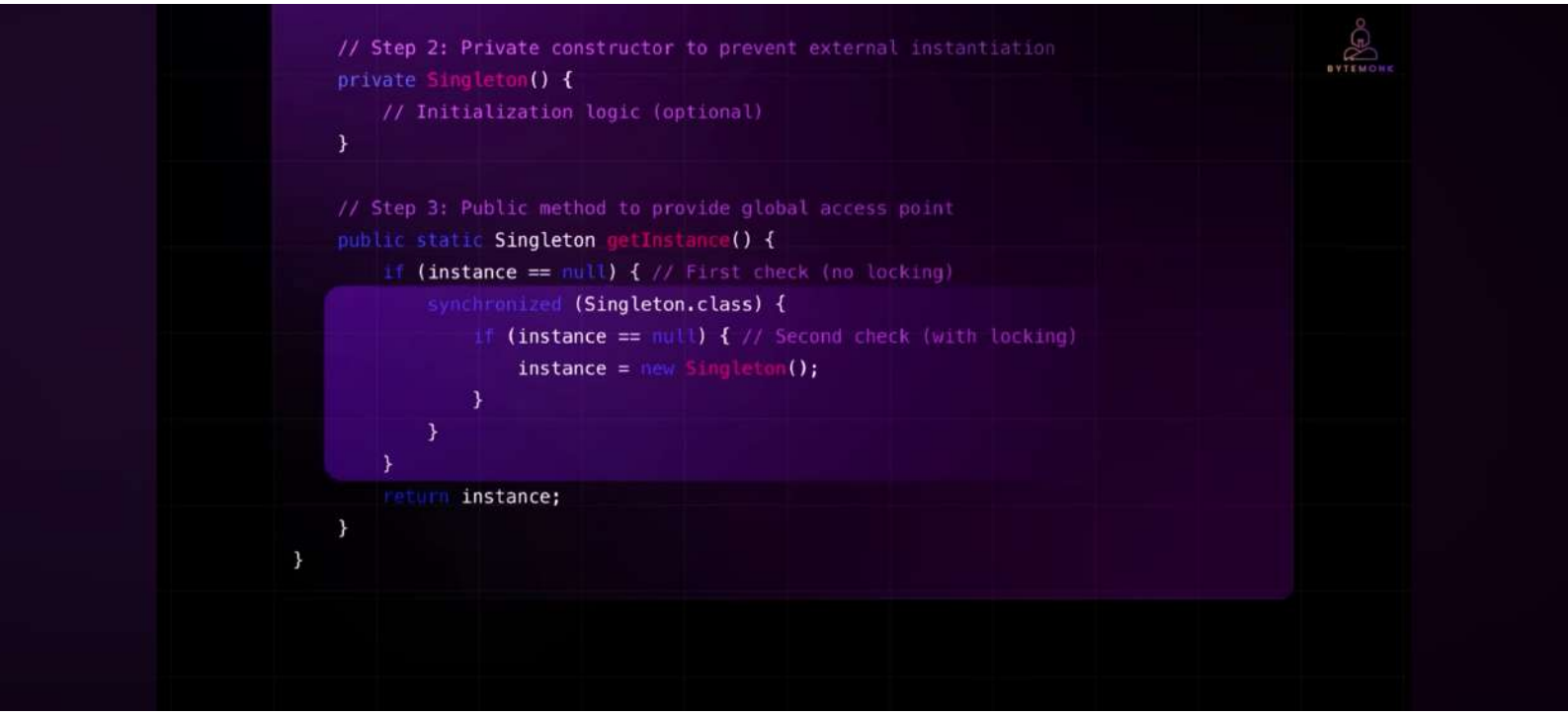
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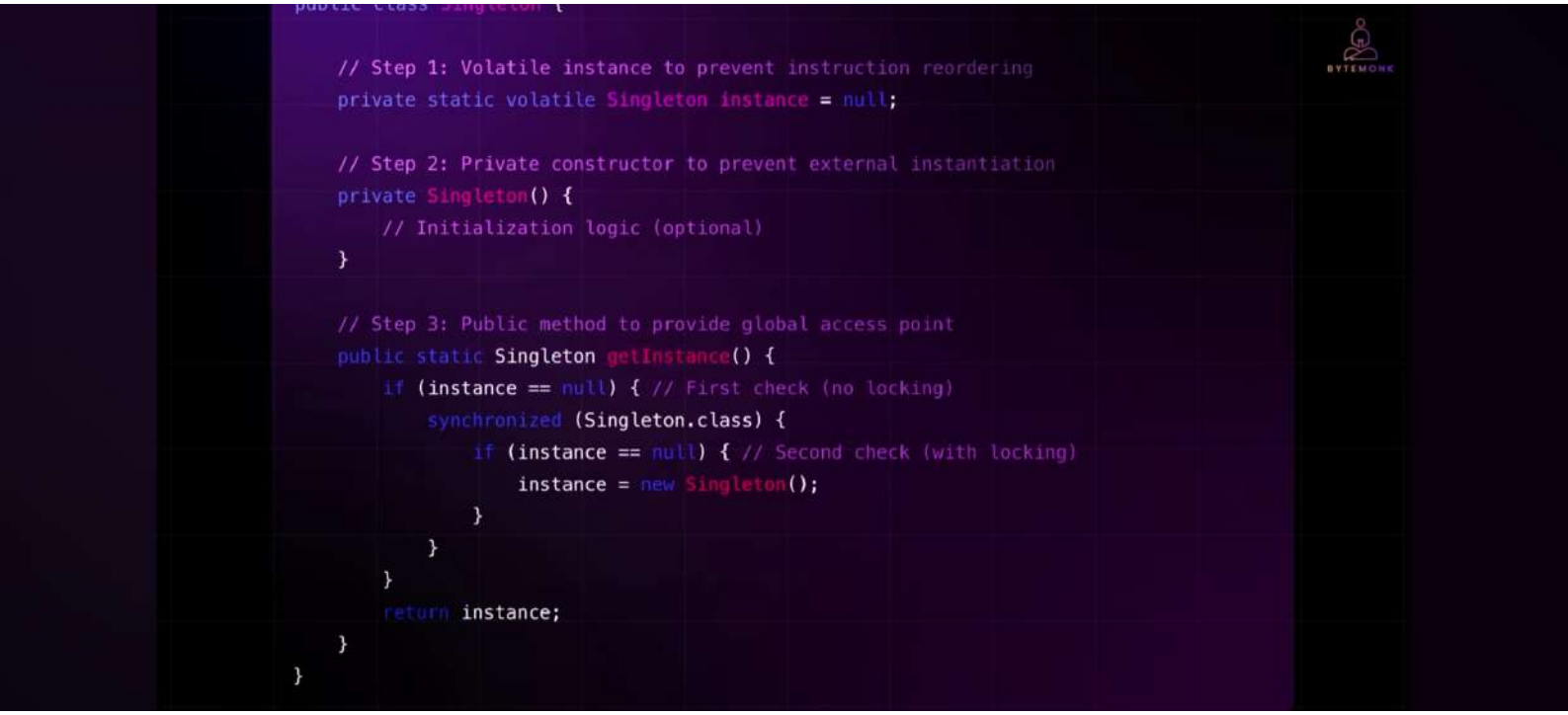
}
}
BYTEMONK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BYTEMONK


BYTEMONK
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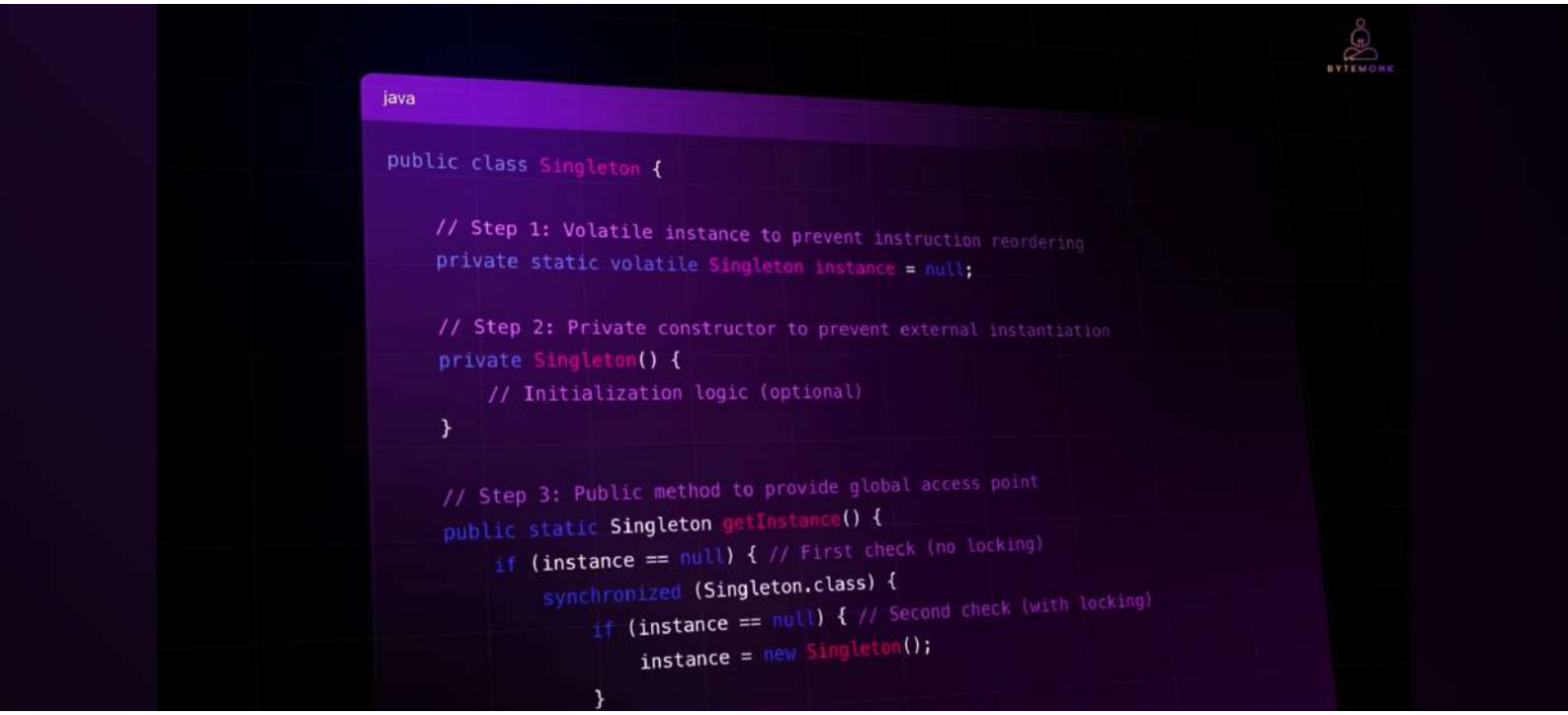
BYTEMONK
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}


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Singleton Pattern
Global Access Point


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Singleton Pattern
Only One Instance

Singleton Pattern

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- A configuration manager
- A logging service
- A thread pool


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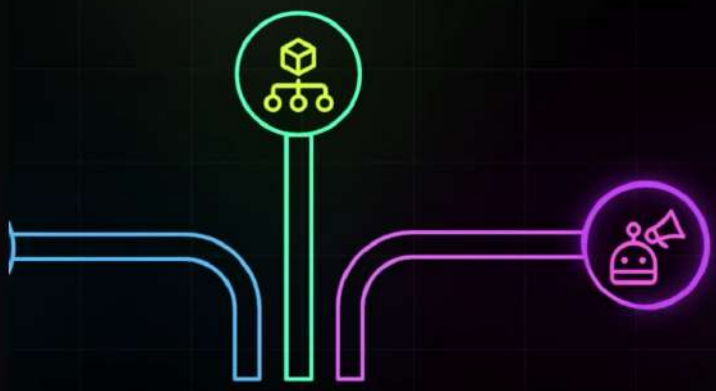
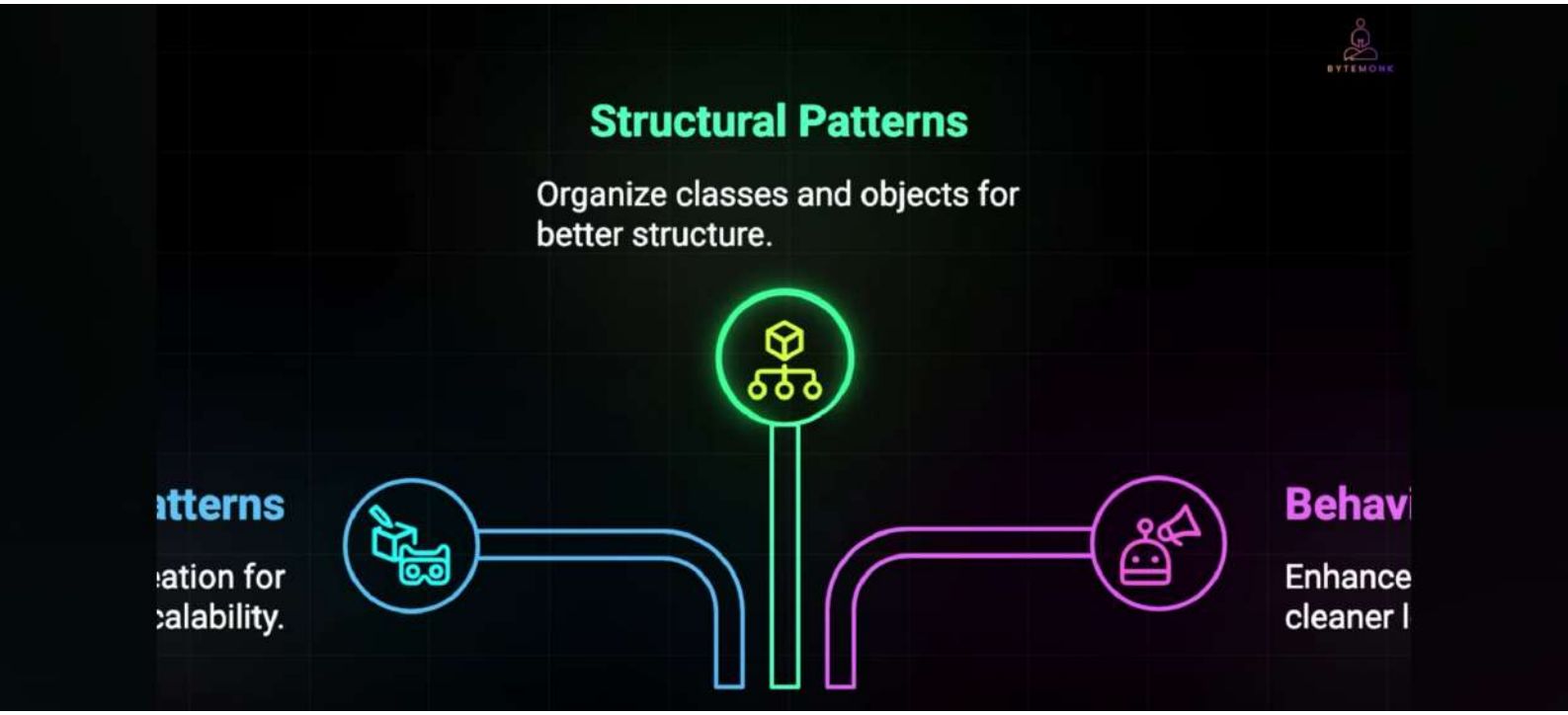
Singleton Pattern

Organize classes and objects for better structure.



Behavioral Patterns

Enhance object communication for cleaner logic.


BYTEMONK
Structural Patterns
Organize classes and objects for better structure.
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Organize classes and objects for better structure.

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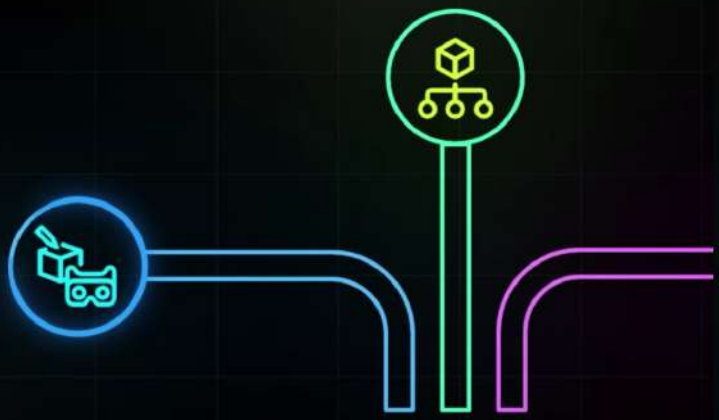
Creational Patterns

Focus on object creation for flexibility and scalability.



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Structural Patterns

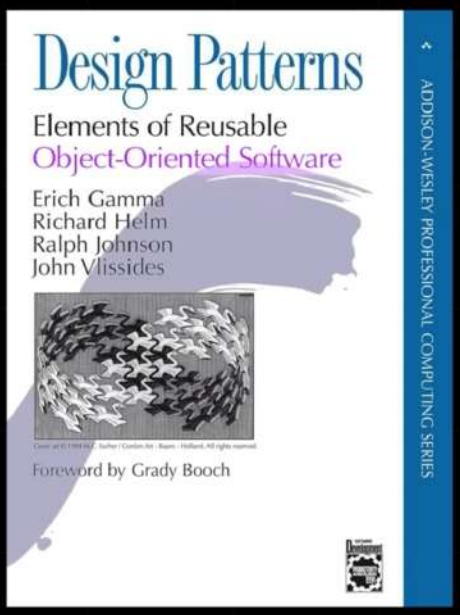
Organize classes and objects for better structure.

Creational Patterns

Focus on object creation for flexibility and scalability.

Behavioral Patterns

Enhance object communication for cleaner logic.


Design Patterns
Elements of Reusable
Object-Oriented Software
Erich Gamma
Richard Helm
Ralph Johnson
John Vlissides
Foreword by Grady Booch
ADDISON-WESLEY PROFESSIONAL COMPUTING SERIES

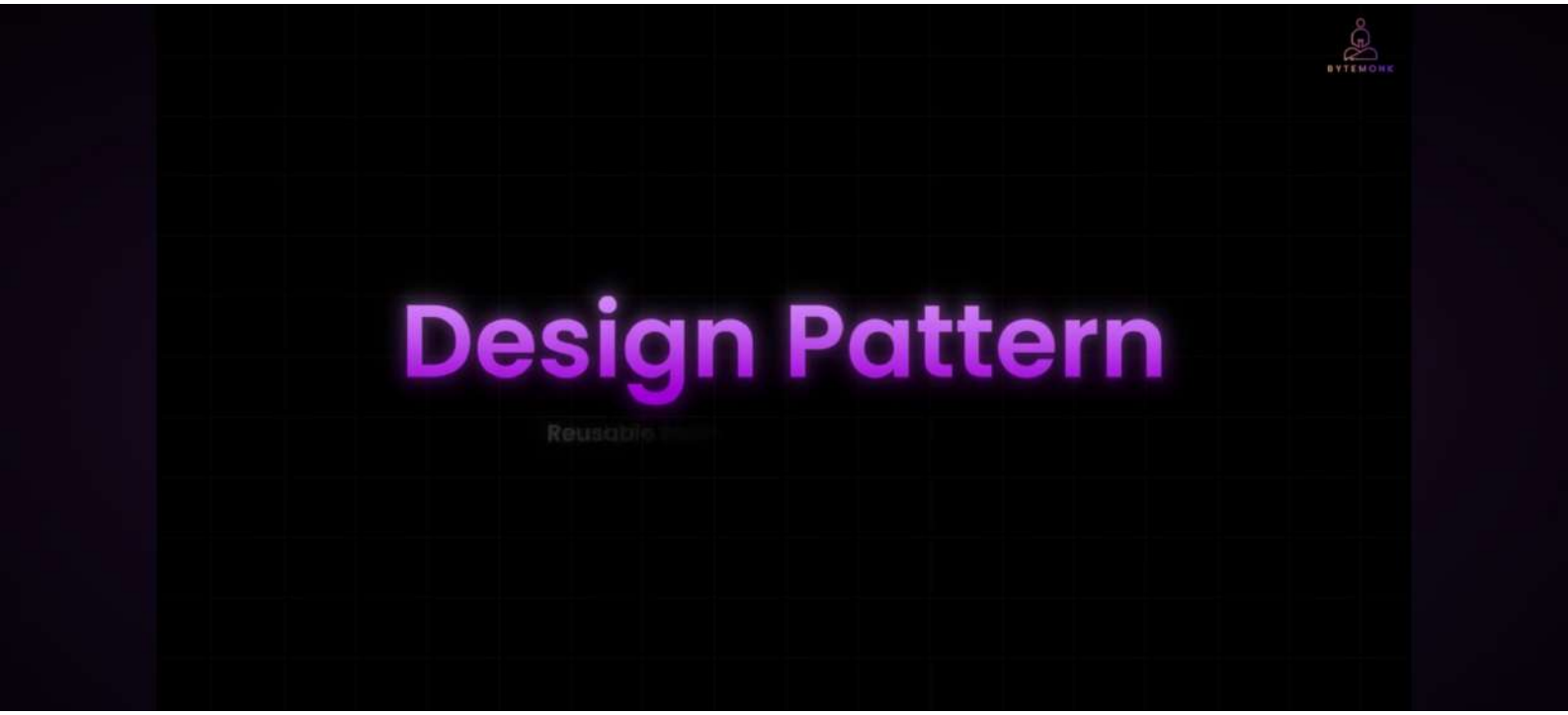
Gang of Four

John Vlissides

Erich Gamma

Ralph Johnson

Richard Helm


BYTEMONK
Design Pattern

BYTEMONK

Structural Patterns

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Creational Patterns

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Behavioral Patterns

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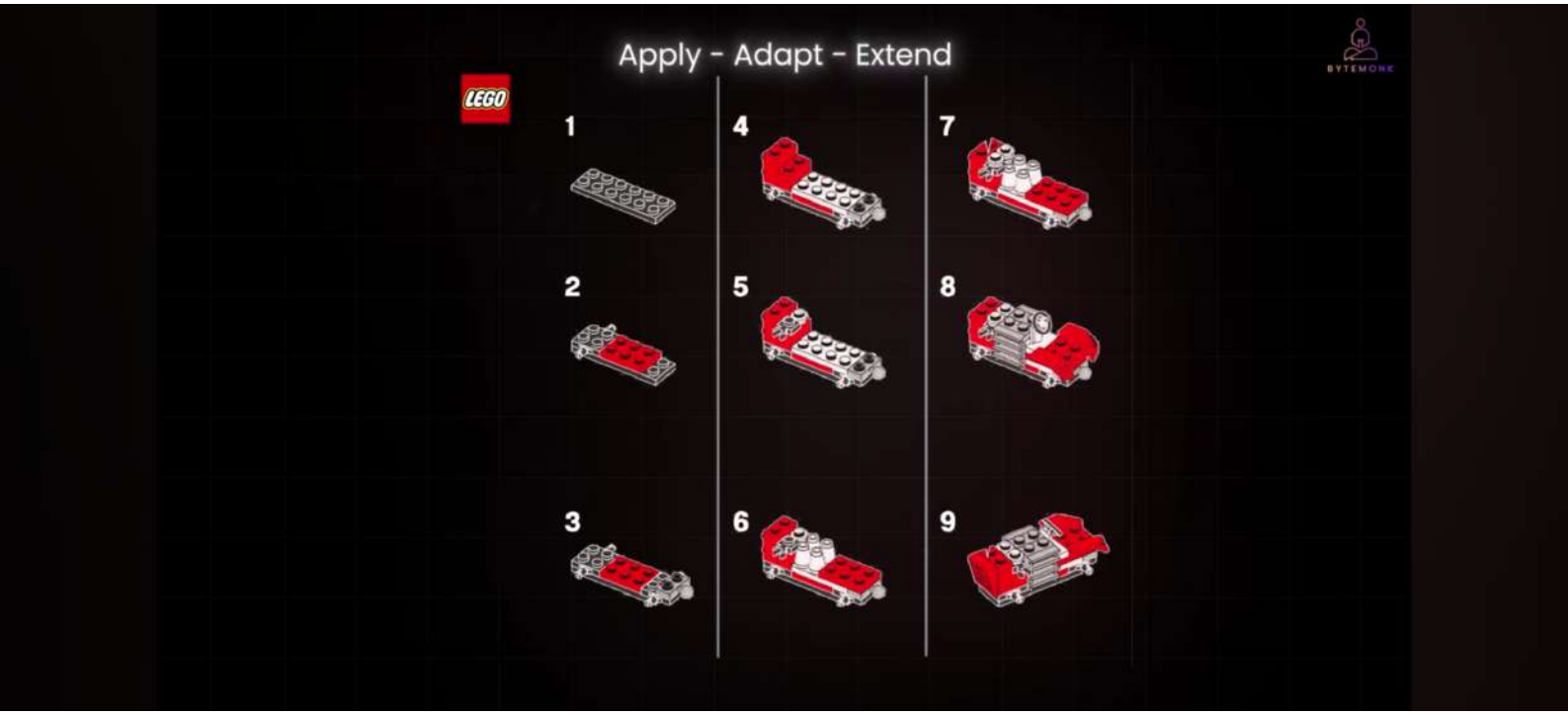
Apply - Adapt - Extend
BYTEMONK
1
2
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